1
Advanced sizing optimisation of concept vehicle structures [Texto impreso] / Pavlina Mihaylova, Niccolò Baldanzini, Marco Pierini

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 23-25 : 40 refs.

Sizing optimisation in the concept stage of vehicle product development is decisive in improving efficiently the static and dynamic performance of the vehicle structure. Although the state-of-the-art gradient-based (GB) approaches can be used for fast optimisation, only speed is not sufficient. The typical sizing optimisation problem for concept finite element (FE) models of the vehicle body and chassis can be extremely complex - with thousands of design variables, highly restricted and discontinuous domain, conflicting objectives. This paper aims to identify and validate an alternative global-search method in order to improve the quality of the final results. Differential evolution (DE) is chosen, implemented and applied for the optimisation of two concept models - a vehicle frame and body. The results confirm that DE can be a feasible alternative for large-scale engineering problems. As DE is robust, scalable, easy to tweak and requires reasonable time, it can be applied in the industry.

International Journal of Vehicle Design. -- 2015, v. 67, n. 1, p. 1-25

1. Sizing optimisation 2. Differencial evolution 3. Advanced global search 4. Vehicle body 5. Concept design 6. Finite element method 7. Automotive engineering

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2
Characteristics of path-tracking skill on a curving road [Texto impreso] / Andreas Erséus, Annika Stensson Trigell, Lars Drugge

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 43-44 : 13 refs.

The objective of this research work is to evaluate the relation of driver skill to measurements done when driving on a regular curving road, i.e., performing a primary driving task. A curving road scenario is designed using both clear sight and fog-limited sight distance. Measures are compared under equal conditions to identify the best separation of recruited driver types. A moving base simulator, VTI Simulator III, is used for the acquisition of driver metrics. Curves are found to be more reliable for identifying driver skill than straight road segments, and a number of measures show good performance in characterising driving skill under the tested conditions, both for clear sight and with the preview limited down to 30 m. The standard deviation proves to be very useful and qualifies for successful driver skill categorisation for commonly sampled data such as the lateral acceleration, yaw rate and steering wheel angle.

International Journal of Vehicle Design. -- 2015, v. 67, n. 1, p. 26-44

1. Characteristics 2. Curve 3. Driver behaviour 4. Driver skill 5. Driving simulator 6. Fog 7. Path tracking 8. Preview distance 9. Recruitment 10. Road

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3
Design of an adaptive sliding mode controller for robust yaw stabilisation of in-wheel-motor-driven electric vehicles [Texto impreso] / Kanghyun Nam, Hiroshi Fujimoto, Yoichi Hori

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 113 : 17 refs.

A robust yaw stability control system is designed to stabilise the vehicle yaw motion. Vehicles undergo changes in parameters and disturbances with respect to the wide range of driving conditions, e.g., tyre-road

conditions. Therefore, a robust control design technique is required to guarantee system stability and enhance the robustness. In this paper, a sliding mode control methodology is applied to make vehicle yaw rate to track its reference with robustness against model uncertainties and disturbances. In addition, a parameter adaptation law is also applied to estimate varying vehicle parameters with respect to road conditions and is incorporated into sliding mode control framework. The control performance of the proposed control system was evaluated through field tests.

International Journal of Vehicle Design. -- 2015, v. 67, n. 1, p. 98-113
1. Adaptative sliding mode control 2. In-wheel motor-driven electric vehicle 3. Yaw stabilisation

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4

Model of coherence function of road unevenness in parallel tracks for vehicle simulation [Texto impreso] / Peter Mucka

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 94-95 : 37 refs.

The coherence function between road elevations of two parallel road tracks was identified. In total, 3492 road records were analysed. The mean empirical unbiased squared coherence function was fitted using 11 different analytical models. The best results were obtained for the Ammon and Bormann model and rational function. The goodness-of-fit was markedly improved in comparison with other currently used models (isotropic, exponential, quadratic, etc.). The results distinguish between asphalt concrete and cement concrete road surfaces. The influences of local road features (bumps, potholes, vertical faults, joints, etc.) and the road profile data pre-processing (low pass filtration and sampling interval) on the coherence function were analysed and found to have negligible effect.

International Journal of Vehicle Design. -- 2015, v. 67, n. 1, p. 77-97

1. Coherence function 2. Long term pavement performance 3. LTPP 4. Parallel tracks 5. Power spectral density 6. PSD 7. Road profile 8. Road unevenness 9. Roll vibration 10. Vehicle vibration

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5

Numerical simulation and experimental analysis of acoustic wave influences on brake mean effective pressure in thrust-ejector inlet pipe of combustion engine [Texto impreso] / Michal Puskár, Tomás Brestovic, Natália Jasminská

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 76 : 10 refs.

This paper is focused on a numerical simulation and experimental analysis of acoustic wave influences on brake mean effective pressure in a thrust-ejector inlet pipe of a piston combustion engine. The experiment is based on a real racing motorbike, which is driven by a piston combustion engine, equipped with a newly developed and patented thrust-ejector inlet pipe. This new inlet pipe is able to eliminate problems concerning an insufficient charging of cylinder with a fresh mixture. The engine sucks the air by overpressure, which is directly related to increased performance and torque. The first part of this paper presents the analytical relations describing acoustic waves in an inlet pipe. The next part contains a numerical simulation performed by software Ansys CFX in order to obtain a detailed description of flowing air, which passes through the ejector into the air box. The experimental measurements were realised using the data-recording system EW&C.

International Journal of Vehicle Design. -- 2015, v. 67, n. 1, p. 63-76

1. Combustion engine 2. Experiment 3. Inlet pipe 4. Numerical simulation

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6

A wind tunnel investigation into the effects of roof curvature on the aerodynamic drag experienced by a light goods vehicle [Texto impreso] / Jenny Holt, Kevin Garry, Stefan Velikov

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.

References: p. 61-62 : 13 refs.

Roof curvature is used to increase ground vehicle camber and enhance rear-body boat-tailing to reduce aerodynamic drag. Little aerodynamic data is published for light goods vehicles (LGVs) which account for a significant proportion of annual UK licensed vehicle miles. This paper details scale wind tunnel measurements at Re = 1.6 × 106 of a generic LGV utilising interchangeable roof panels to investigate the effects of curved roof profile on aerodynamic drag at simulated crosswinds between -6° and 16°. Optimum magnitudes of roof profile depth and axial location are suggested and the limited dataset indicates that increasing roof curvature is effective in reducing drag over a large yaw range, compared to a flat roof profile. This is primarily due to increased base pressure, possibly from enhanced mixing of longitudinal vortices shed from the rear-body upper side edges and increased turbulent mixing in the near-wake due to the increased effective boat-tail angle.

International Journal of Vehicle Design. -- 2015, v. 67, n. 1, p. 45-62

1. Aerodynamic drag reduction 2. Boat tail 3. LGV 4. Light goods vehicle 5. Roof curvature 6. Wind averaged drag 7. Wind tunnel 8. Yaw